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EXAMINER	
BECK, ALEXANDER S	

ART UNIT	PAPER NUMBER
2629	

NOTIFICATION DATE	DELIVERY MODE
12/11/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No.	Applicant(s)	
	10/559,916	LIENHARD, MARTIN	
	Examiner	Art Unit	
	Alexander S. Beck	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☒ Claim(s) *18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Acknowledgment is made of the amendment filed September 16, 2009 ("Amend."), in which: claims 1, 9 and 10 are amended; new claims 11-18 are added; and the rejections of the claims are traversed. Claims 1-18 are currently pending and an Office action on the merits follows.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 9-12 and 15-17 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,407,727 to Plangger ("Plangger").

As to claim 1, Plangger discloses a display device comprising:

a liquid crystal material (e.g., Plangger, 2; Fig. 1) between a first substrate (e.g., Plangger, 3; Fig. 1) provided with row electrodes (e.g., Plangger, 5; Fig. 1) and a second substrate (e.g., Plangger, 4; Fig. 1) provided with column electrodes (e.g., Plangger, 6; Fig. 1),

driving circuitry for driving the column electrodes (e.g., Plangger, 6; Fig. 1) in conformity with an image to be displayed (e.g., Plangger, 12, data register; Fig. 2), and

driving circuitry (e.g., Plangger, 14, multiplex circuit; Fig. 2) for driving the row electrodes (e.g., Plangger, 5; Fig. 1),

wherein during a row selection time at least one row is selected (e.g., Plangger, col. 1, ll. 11-12) and column voltages are supplied to the column electrodes (e.g., Plangger, col. 1, ll. 12-13),

wherein the column voltage waveform (e.g., Plangger, data voltages, col. 1, ll. 23-27) depends on a grey scale (e.g., Plangger, t_W, Fig. 3, col. 3, ll. 6-10) to be displayed by a driven pixel in a certain column and depends on a used selection signal supplied to the selected row (e.g., Plangger, col. 1, ll. 20-23),

wherein a column voltage is switchable between at least two different column voltage levels (e.g., Plangger, V_d, 0; Fig. 3a) during the row selection time (e.g., Plangger, row selection signals, Figs. 3b-3f) and the column voltage waveform (Plangger, col. 1, ll. 23-27) for a following row selection time (e.g., Plangger, row selection signals, Figs. 3b-3f) is mirrored (Plangger, col. 4, l. 8) on a mirror axis (e.g., Plangger, $t_{1''}$; Fig. 8) depending on the column voltage at the end of the current row selection time and the column voltage at the end of the following row selection time (e.g., Plangger, Fig. 8, col. 4, ll. 7-14).

As to claim 2, Plangger discloses a display device as claimed in claim 1, wherein the mirroring (e.g., Plangger, col. 4, l. 8) is performed if the column voltage

at the end of the current row selection time is the same as the column voltage at the end of the following row selection time (e.g., Plangger, Fig. 8, col. 4, ll. 7-14).

As to claim 9, Plangger discloses a circuit arrangement (e.g., Plangger, Fig. 2) for driving a display device having row electrodes (e.g., Plangger, 15; Fig. 2) and column electrodes (e.g., Plangger, 16; Fig. 2), the circuit arrangement comprising:

driving means for driving the column electrodes in conformity with an image to be displayed on the display (e.g., Plangger, 12, data register; Fig. 2) and

driving means for driving the row electrodes (e.g., Plangger, 14, multiplex circuit; Fig. 2), at least one row electrode is selected during a row selection time (e.g., Plangger, col. 1, ll. 11-12) and column voltages are supplied to the column electrodes (e.g., Plangger, col. 1, ll. 12-13),

wherein the column voltage waveform (e.g., data voltages; col. 1, ll. 23-27) depends on the grey scale (e.g., Plangger, t_W, Fig. 3, col. 3, ll. 6-10) to be displayed by a driven pixel in a certain column and depends on a used selection signal supplied to the selected row (e.g., Plangger, col. 1, ll. 20-23),

a column voltage is switchable between at least two different column voltage levels (e.g., Plangger, V_d, 0; Fig. 3a) during the row selection time (e.g., Plangger, row selection signals, Figs. 3b-3f) and

the column voltage waveform (e.g., Plangger, col. 1, ll. 23-27) for a following row selection time (e.g., Plangger, row selection signals, Figs. 3b-3f) is mirrored (e.g., Plangger, col. 4, l. 8) on a mirror axis (e.g., Plangger, $t_{1''}$; Fig. 8) depending on the column voltage at the end of the current row selection time and the column voltage at the end of the following row selection time (e.g., Plangger, Fig. 8; col. 4, ll. 7-14).

As to claim 10, Plangger discloses a method for driving a display device having row electrodes (e.g., Plangger, 5; Fig. 1) and column electrodes (e.g., Plangger, 6; Fig. 1), the method comprising:

during a row selection time, selecting at least one row (e.g., Plangger, col. 1, ll. 11-12) and supplying column voltages to the column electrodes (e.g., Plangger, col. 1, ll. 12-13), wherein the column voltage waveform (e.g., Plangger, data voltages; col. 1, ll. 23-27) depends on a grey scale (e.g., Plangger, t_W, Fig. 3, col. 3, ll. 6-10) to be displayed by a driven pixel in a certain column and depends on a used selection signal supplied to the selected row (e.g., Plangger, col. 1, ll. 20-23), the column voltage having at least two different column voltage levels (e.g., Plangger, V_d, 0; Fig. 3a) during the row selection time (e.g., Plangger, row selection signals, Figs. 3b-3f), and

the column voltage waveform (e.g., Plangger, col. 1, ll. 23-27) for a following row selection time (e.g., Plangger, row selection signals, Figs. 3b-3f) is mirrored (e.g., Plangger, col. 4, l. 8) on a mirror axis (e.g., Plangger, $t_{1''}$; Fig. 8) depending on the column voltage at the end of the current row selection time and the column voltage at the end of the following row selection time (e.g., Plangger, Fig. 8; col. 4, ll. 7-14).

As to claim 11, Plangger discloses a display device comprising:

a liquid crystal material (e.g., Plangger, 2; Fig. 1) between a first substrate (e.g., Plangger, 3; Fig. 1) provided with row electrodes (e.g., Plangger, 5; Fig. 1) and a second substrate (e.g., Plangger, 4; Fig. 1) provided with column electrodes (e.g., Plangger, 6; Fig. 1);

a driver circuit arrangement, including a row driver circuit (e.g., Plangger, 14, multiplex circuit; Fig. 2) and a column driver circuit (e.g., Plangger, 12, data register; Fig. 2), configured to drive the row electrodes and to drive the column electrodes in conformity with an image to be displayed, by

during an initial row selection time, selecting at least one row and applying column voltages to the column electrodes using a voltage waveform for each column that is based upon a grey scale (e.g., Plangger, t_W, Fig. 3, col. 3, ll. 6-10) to be displayed by a driven pixel in the column and upon a selection signal supplied to the selected row, the column voltage being switchable between at least two different column voltage levels (e.g., Plangger, V_d, 0; Fig. 3a) during the row selection time (e.g., Plangger, row selection signals, Figs. 3b-3f) (e.g., Plangger, col. 1, ll. 11-27), and

during a following row selection time immediately after the initial selection time (e.g., Plangger, row selection signals, Figs. 3b-3f), selectively applying column voltages to each of the column electrodes using the voltage waveform applied to the column during the initial row selection time as mirrored on a mirror axis (e.g., Plangger, $t_{1''}$; Fig. 8), based upon the column voltage at the end of said row selection time and the column voltage at the end of the following row selection time (e.g., Plangger, Fig. 8, col. 4, ll. 7-14).

As to claim 12, Plangger discloses wherein the driver circuit arrangement is configured to selectively apply column voltages to the column electrodes during the following row selection time by applying a mirrored version of the voltage waveform applied to the column electrodes during the initial row selection time, in response to the column voltage at the end of the initial row selection time being the same voltage as the column voltage at the end of the following row selection time (e.g., Plangger, Fig. 8, col. 4, ll. 7-14).

As to claim 15, Plangger discloses wherein the driver circuit arrangement selectively applies the mirrored voltage waveform when the application of the mirrored voltage waveform eliminates a column voltage transition between the initial and following row selection times (e.g., Plangger, Fig. 8, col. 4, ll. 7-14).

As to claim 16, Plangger discloses wherein the driver circuit arrangement only applies the mirrored voltage waveform when the application of the mirrored voltage waveform eliminates a column voltage transition between the initial and following row selection times (e.g., Plangger, Fig. 8, col. 4, ll. 7-14).

As to claim 17, Plangger discloses wherein the driver circuit arrangement is configured, for time window having at least three row sub selection time slots, to selectively apply a mirrored voltage waveform in response to a voltage level of the third row sub selection time slot being the same as the voltage level as the first row sub selection time slot (e.g., Plangger, Fig. 8, col. 4, ll. 7-14; wherein the first and third sub selection time slots are interpreted as being sequential to one another).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,407,727 to Plangger in view of U.S. Patent No. 6,538,629 to Ito ("Ito").

As to claims 3 and 13, Plangger does not disclose expressly groups of p rows that are driven simultaneously and row electrodes supply groups of p rows with mutually orthogonal selection signals for driving pixels, in which pixels are defined by overlapping parts of the row and column electrodes, wherein the column voltage is calculated depending on the grey scales to be displayed by the p concurrently driven pixels in a certain column and depending on the used mutually orthogonal selection signals for the respective group of p rows, as claimed.

Ito discloses a display device (e.g., Ito, 40; Fig. 1) wherein groups of p rows are driven simultaneously (e.g., Ito, multi-line selection driving method; col. 3, l. 3) and the row electrodes supply groups of p rows with mutually orthogonal selection signals for driving pixels (e.g., Ito, Page (Row) Address Control Circuit; Fig. 2; col. 8, ll. 14-19), in which pixels are defined by overlapping parts of the row and column electrodes (e.g., Ito, implicitly suggested in LC Panel 40; Fig. 1), wherein the column voltage is calculated depending on the grey scales (e.g., Ito, SEG4m+4, wherein n is a positive integer 1 through 4; Fig. 7) to be displayed by the p concurrently driven pixels in a certain column and depending on the used mutually orthogonal selection signals for the respective group of p rows (e.g., Ito, addressing of gray-scale display; Fig. 9a). At the time the invention was made it would have been obvious to one having ordinary skill in the art to modify the display device of Plangger such that it included simultaneous row driving and column voltage grey scales, as discussed above, and as taught by Ito. As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to lower power consumption (Ito, col. 2, ll. 47-48).

6. Claims 4-8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,407,727 to Plangger in view of European Patent Pub. No. 1341150 by Rodeschini et al. ("Rodeschini").

As to claim 4, Plangger does not disclose expressly wherein the mirroring is done adaptively depending on the picture to be displayed, as claimed. Rodeschini discloses the mirroring is done adaptively depending on the picture to be displayed (e.g., Rodeschini, second signals C3(t), C5(t); determine grey level by means of an alternance of corresponding values distinct signal levels for intervals of time comprised in the first preset interval time by means of a first PWM modulation; Abstract). At the time the invention was made it would have been obvious to one having ordinary skill in the art to modify the display device of Plangger by including adaptive mirroring, as discussed above, and as taught by Rodeschini. As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to reduce power consumption (Rodeschini, Abstract).

As to claim 5, Plangger does not disclose the mirror axis is defined in the middle of a row selection time, as claimed. Rodeschini discloses wherein the mirror axis is defined in the middle of a row selection time (e.g., Rodeschini, voltage level for timing between various G1 and G2 points; Fig. 5). At the time the invention was made it would have been obvious to one having ordinary skill in the art to modify the display device of Plangger by including adaptive mirroring, as discussed above, and as taught by Rodeschini. As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to reduce power consumption (Rodeschini, Abstract).

As to claim 6, Plangger does not disclose expressly wherein the mirror axis is defined adaptively, as claimed. Rodeschini discloses wherein the mirror axis is defined adaptively (e.g., Rodeschini, voltage level for timing varies, adaptively, between various G1 and G2 points; Fig. 5). At the time the invention was made it would have been obvious to one having ordinary skill in the art to modify the display device of Plangger by including adaptive mirroring, as discussed above, and

as taught by Rodeschini. As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to reduce power consumption (Rodeschini, Abstract).

As to claim 7, Plangger does not disclose expressly wherein the row selection time is subdivided into n.sub.pwm sub slots and the column voltage signal can have p+1 different voltage levels during a row selection time, as claimed. Rodeschini discloses wherein the row selection time is subdivided into n.sub.pwm sub slots (e.g., Rodeschini, multi-line addressing; ¶ 0004) and the column voltage signal can have p+1 different voltage levels during a row selection time (e.g., Rodeschini, pulse width modulation with grey levels of G1, G2, W(hite) and B(lack); ¶ 0007). At the time the invention was made it would have been obvious to one having ordinary skill in the art to modify the display device of Plangger by including adaptive mirroring, as discussed above, and as taught by Rodeschini. As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to reduce power consumption (Rodeschini, Abstract).

As to claim 8, Plangger does not disclose expressly wherein the following column voltage level for the subsequent row selection time is calculated during the current row selection time, as claimed. Rodeschini discloses wherein the following column voltage level for the subsequent row selection time is calculated during the current row selection time (e.g., Rodeschini, second signals C3(t) and C5(t) calculate for subsequent row selection times; Abstract). At the time the invention was made it would have been obvious to one having ordinary skill in the art to modify the display device of Plangger by including adaptive mirroring, as discussed above, and as taught by Rodeschini. As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to reduce power consumption (Rodeschini, Abstract).

As to claim 14, this limitation has been addressed in the discussion of claims 4 and 6 above.

Allowable Subject Matter

7. Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. Applicant's arguments filed September 16, 2009, have been fully considered but they are not persuasive.

Applicant argues that the "mirroring" shown in Figure 8 of Plangger and cited at column 4 is directed to a repeated row selection signal, and the mirroring is not based upon the respective column voltages (or any voltages) at the end of successive selection times, as claimed (Amend., p. 7). Examiner respectfully disagrees and submits that the first graph in Figure 8, ranging from 0 to Vd, is the "mirroring" disclosed in column 4 and is directed to a column voltage (Plangger, col. 4, ll. 7-14).

Applicant argues that Plangger does not disclose mirroring a waveform if the voltages match, as claimed (Amend., p. 8). Examiner respectfully disagrees and submits that Figure 7a illustrates when two successive column voltages end at the same voltage of 0. To reduce dissipation of the display driving circuitry, "mirroring" is implemented as shown in Figure 8 by shifting the end of the data pulse of the

first selection period to cause the data pulses of two subsequent selections to be combined in one pulse, leading to a reduction of dissipation again (Plangger, col. 4, ll. 7-14).

Applicant argues that there is no motivation to combine Plangger with Ito and Rodeschini since there would be no power saving advantages, as alleged in the Office action (Amend., pp. 8-9). Examiner respectfully disagrees. As to Ito, since the sequence in which the plurality of differently weighted selection periods is selected is varied for each horizontal period, low power consumption is realized, and gray-scale display can be achieved successfully without deterioration in contrast and occurrence of flickers or crosstalk (Ito, col. 6, ll. 42-47). As to Rodeschini, the driving schemes relied upon utilizes a pulse width modulation technique (PWM) that reduces current consumption (Rodeschini, ¶¶ 0007-0013).

Conclusion

9. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander S. Beck whose telephone number is (571) 272-7765. The examiner can normally be reached on M-F, 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sumati Lefkowitz/
Supervisory Patent Examiner, Art Unit 2629

asb